

REMARKS

This Amendment is responsive to the final Office Action mailed on June 5, 2007, rejecting all pending claims 1-7, 9-13 and 23. By this response claim 1 is amended. Entry of this amendment and reconsideration and allowance of claims 1-7, 9-13 and 23 are requested.

§132 Objection and §112 Rejection

Portions of the amendments made by the applicant's April 26, 2007, response were objected to under 35 U.S.C. §132(a), and claims 1-7, 9-13 and 23 rejected under 35 U.S.C. §112, first paragraph, on the basis that they are not supported by the original disclosure. Specifically, the Office Action objected to the claim features "including forming masked portions of the conductive lead layer" and "wherein the first conductive material does not electroplate onto any unmasked portions of the conductive lead layer until the built up material reaches a thickness at which the conductive material contacts any unmasked portions of the conductive lead layer at the interconnect site."

The applicant respectfully disagrees with this assertion. These claim features are clearly apparent from the specification as a whole to those of skill in the art. Nonetheless, to advance the prosecution of this application the noted claim features are by this response canceled from claim 1 as requested in the Office Action.

As a substitute for the canceled claim language in the electroplating step, the applicant has added claim language that is expressly supported by the specification. This step recites building up the conductive material on the spring metal layer to a height about equal to or greater than a surface of the conductive lead layer. The newly added features recite "then, with continued electroplating, contacting and forming an electrical connection to any unmasked portions of the conductive lead layer, and also plating onto and building up the first conductive material onto any unmasked portions of the conductive lead layer". Support for this amendment can be found, for example, on page 9 of the specification where it is stated that:

"At step 518 electric current is applied to the spring metal layer 112, 212 and 412 in such a manner as to cause interconnect plating 146, 246 and 446 to plate onto the exposed portions of

the spring metal layer 112, 212 and 412, respectively. The thickness of the interconnect plating 146, 246 and 446 will continue to increase with continued plating. With respect to interconnects 140 and 240, the interconnect plating 146 and 446, respectively, will build up on the spring metal layer 112 and 212 to a thickness at which it will contact the exposed conductor layer 114 and 214. This built up interconnect plating 146 and 246 will then form an electrical connection with the conductor layer 114 and 214 of the lead 122 and 222, respectively, to which the contact is being formed. With continued plating at step 518 the interconnect plating 146 and 246 will also plate onto and build up on the exposed portions of the conductor layer 114 and 214 at the interconnect site."

Entry of these claim amendments is requested.

§103 Rejection of Claims 1, 6, 7, 9-11 and 23

Claims 1, 6, 7, 9-11 and 23 stand rejected under 35 U.S.C. §103 as being unpatentable over the Cowles et al. U.S. Patent 6,700,748 in view of the Rinne et al. U.S. Patent 6,117,299. The Office Action asserts that the Cowles patent teaches a method for plating solder to form an electrical interconnect on an integrated lead suspension, but differs from the claimed invention by not teaching that the conductive material initially does not electroplate onto the unmasked portions of the conductive lead layer. The Office Action also notes that the Cowles patent is silent to electroplating the conductive material to a height about equal to or greater than the surface of the conductive lead layer. However, the Rinne patent is said to teach electroplating an aperture or via in the insulating layer with a conductive material to the same thickness as the top surface layer. The position was taken that it would have been obvious to modify the method shown in the Cowles patent by electroplating as taught by the Rinne patent because it would build up an electroplated conductive material from the bottom of the aperture and prevent the formation of voids.

As discussed above, the applicant's have by this response revised the claim language characterizing the sequence of the conductive material build up during the electroplating step. During this step the conductive material first builds up on the spring metal layer, and then with continued electroplating contacts and forms an electrical connection to any

unmasked portions of the conductive lead layer, and also plating onto and building up the first conductive material onto any unmasked portions of the conductive lead layer.

Other claim amendments are also made to better distinguish the claimed invention from the prior art references of record. By these amendments the method is now recited to be one for forming an electroplated electrical interconnect. The method also includes incorporating the integrated lead suspension or suspension component, including the plated interconnect having the physical structure of the conductive material as electroplated, into a disk drive. A method having these features and advantages is neither taught nor suggested by the prior art of record.

The present invention is a method for forming an *electroplated* interconnect on an integrated lead suspension or suspension component. The Cowles patent, in contrast, discloses a method for making a *solder* interconnect. These are substantially different processes. Electroplating is used in the Cowles patent method merely as a process to initially deposit an amount of solder in the via. The solder interconnect is formed when this initially deposited solder is subsequently reflowed to increase its adhesion to the underlying material. The Office Action acknowledges that the Cowles patent teaches that the solder is initially plated on both the stainless steel and copper layers in the via in order to increase the amount of solder being plated, and that since it is subsequently reflowed, plating on either one of the layers or both layers simultaneously does not affect the final interconnect. But even assuming for purposes of discussion that this assertion is correct, the fact remains that the soldering process shown in the Cowles patent produces a soldered interconnect, not a plated interconnect that is formed in the manner recited in the applicant's claims.

The Office Action asserts that it would have been obvious to modify the method shown in the Cowles patent to electroplate on the base layer as taught by the Rinne patent because it would build up electroplated conductive material from the bottom of the aperture and prevent the formation of voids. For a number of reasons the applicant disagrees with this assertion. To begin with, the Cowles patent provides no indication that void formation is a problem, much less one that might be corrected by using steps shown in the Rinne patent. And even assuming for purposes of discussion that there was a reason to combine the

features of these references, the resulting method would still not have the features of those recited in the applicant's claims. The Rinne patent discloses a method for forming solder bumps on integrated circuit substrates. As shown in connection with Figure 1F, the solder bumps (30) are electroplated onto a wetting layer (28) in the openings of a plating template. Like the process disclosed in the Cowles patent, this electroplating step is an initial step to apply the solder to the desired location. As noted in the first paragraph in column 7 of the Rinne patent, the electroplated solder bumps are then reflowed. In addition to not disclosing a method for forming an interconnect on an integrated lead suspension component, the Rinne patent does not disclose a plated interconnect having the physical structure of the conductive material as electroplated.

In response to the applicant's earlier amendment reciting the plated interconnect as having the physical structure of the material as electroplated, the Office Action states that this feature does not exclude other processing steps such as reflowing. The applicant disagrees with this assertion since the clear implication of the amended language is that the final product of the claimed method is an interconnect having the physical structure of the material as electroplated. However, to more particularly point out and distinctly claim the applicant's electroplated interconnect forming method, and to distinguish this invention from the soldering method shown in the Cowles patent, claim 1 is amended by this response to recite the step of incorporating the integrated lead suspension or suspension component, including the plated interconnect having the physical structure of the conductive material as electroplated, into a disk drive. Even assuming for purposes of argument that it would be obvious to combine the features of the Cowles and Rinne patents, the resulting method still would not produce a suspension or suspension component having an plated interconnect with this physical structure incorporated into a disk drive. This feature of the invention is also distinctly claimed by the amendment made by this response to the preamble characterizing the method as one for forming an *electroplated* interconnect (i.e., as opposed to a soldered interconnect).

The invention offers a number of important advantages, it can be efficiently performed to a high degree of precision. It also produces interconnects having higher quality

physical and electrical characteristics than those produced by the soldering method shown in the prior art of record.

Withdrawal of the §103 rejection of claims 1, 6, 7, 9-11 and 23 for these reasons is requested.

§103 Rejection of claims 2-5, 12 and 13

Claims 2-5 stand rejected under 35 U.S.C. §103 as being unpatentable over the Cowles and Rinne patents and further in view of the Shangguan et al. U.S. Patent 6,082,610. Claims 12 and 13 stand rejected under 35 U.S.C. §103 as being unpatentable over the Cowles and Rinne patents and further in view of the Gay et al. U.S. Patent 4,764,260. However, these claims depend directly or indirectly from claim 1 which is patentable for the reasons discussed above. Withdrawal of the §103 rejection of these claims for at least this reason is requested.

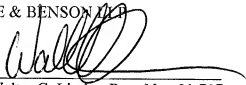
Conclusion

All pending claims 1-7, 9-13 and 23 recite an interconnect forming method that is neither taught nor suggested by the references of record. Entry of this amendment and allowance of the claims is requested.

Respectfully submitted,

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